Professional Master's Degree

Rehabilitation and Energy Saving in Buildings

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Professional Master's Degree
Rehabilitation and Energy Saving in Buildings

- Modality: **online**
- Duration: **12 months**
- Certificate: **TECH Global University**
- Schedule: **at your own pace**
- Exams: **online**

Website: **www.techtitute.com/pk/engineering/professional-master-degree/master-rehabilitation-energy-saving-buildings**

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01

Introduction

When undertaking a refurbishment project in the construction field, the professional in this sector will have to face the incorporation of the conditions that energy saving currently requires in all interventions of this type. This challenge must be supported by the efficient solutions that new materials, systems and installations can bring to the final result, seeking a degree of efficiency that provides the quality and expectations that this market, and current legislation, demand. This Professional Master's Degree has been created to become a high qualification tool, which will provide you with the most updated knowledge in all the aspects involved in this field of work.

Acquire the most advanced and up to date knowledge in the field of Building Rehabilitation and Energy Saving with a Professional Master's Degree of high qualification and educational impact"

This Professional Master's Degree effectively combines the technical and technological knowledge of projects and construction necessary to develop a project or work based on the necessary energy saving measures, whether in the field of intervention in existing buildings (Energy Rehabilitation) or new construction (Energy Saving).

It establishes a work dynamic that enables the student to develop projects of different scales with maximum rigor analyzing the different intervention options, either through passive measures (affecting the building envelope) or based on active measures (affecting the building's systems and installations).

The exposure of success stories that develop the objective in a clear and concise way, able to extrapolate it to future projects with maximum requirements of Energy Saving.

In addition, the guidelines for checking the current state of the existing building under current regulations (Energy Audit), technical requirements based on the latest regulatory changes (Technical Code 2019) as well as a very precise and technical development of the intervention measures to optimize the energy demand of the building are established.

The fundamentally practical qualification of the team that teaches the master offers a precise vision of analysis of each of the intervention measures in buildings based on their best energy performance.

During the development of the Professional Master's Degree, the analysis of the possible measures to be developed in a Rehabilitation / Energy Saving project will be carried out based on the experience of singular works and real success cases, analyzing the different options of intervention in the energy field concerning materials, systems and installations of high energy performance.

On the other hand, the bases for the development of cost control analysis and selection of appropriate intervention option in the development of project and work are integrated, as well as the analysis of the control of the rigor of the objective based on the quality of the construction.

With this Professional Master's Degree in Rehabilitation and Energy Saving in Buildings you will be educated in the latest trends of the sector related to maximum Energy Saving and Sustainability, obtaining a wide knowledge of the development options and requirements in the international field.

This **Professional Master's Degree in Rehabilitation and Energy Saving in Building** contains the most complete and up-to-date program on the market. The most important features include:

- Latest technology in online teaching software
- Highly visual teaching system, supported by graphic and schematic contents that are easy to assimilate and understand
- Practical cases presented by practicing experts
- State-of-the-art interactive video systems
- Teaching supported by telepractice
- Continuous updating and recycling systems
- Self-regulating learning: full compatibility with other occupations
- Practical exercises for self-evaluation and learning verification
- Support groups and educational synergies: questions to the expert, debate and knowledge forums
- Communication with the teacher and individual reflection work
- Content that is accessible from any fixed or portable device with an Internet connection
- Supplementary documentation databases are permanently available, even after the course

An intensive and comprehensive study of the development options and energy efficiency requirements that apply in the international field"

Learn how to develop projects of various scales by analyzing the different optimization options, through passive or active measures and give your projects the energy quality that the market demands"

Our teaching staff is made up of professionals from different fields related to this specialty. In this way, we ensure that we provide you with the educational update we are aiming for. A multidisciplinary team of professionals qualifed and experienced in different environments, who will develop the theoretical knowledge in an efficient way, but above all, they will bring their practical knowledge from their own experience to the course: one of the differential qualities of this program.

This mastery of the subject matter is complemented by the effectiveness of the methodological design. Developed by a multidisciplinary team of e-learning experts, it integrates the latest advances in educational technology. This way, you will be able to study with a range of comfortable and versatile multimedia tools that will give you the operability you need in your specialization.

The design of this program is based on Problem-Based Learning: an approach that conceives learning as a highly practical process. To achieve this remotely, we will use telepractice learning: with the help of an innovative interactive video system, and learning from an expert, you will be able to acquire the knowledge as if you were actually dealing with the scenario you are learning about. A concept that will allow you to integrate and fix learning in a more realistic and permanent way.

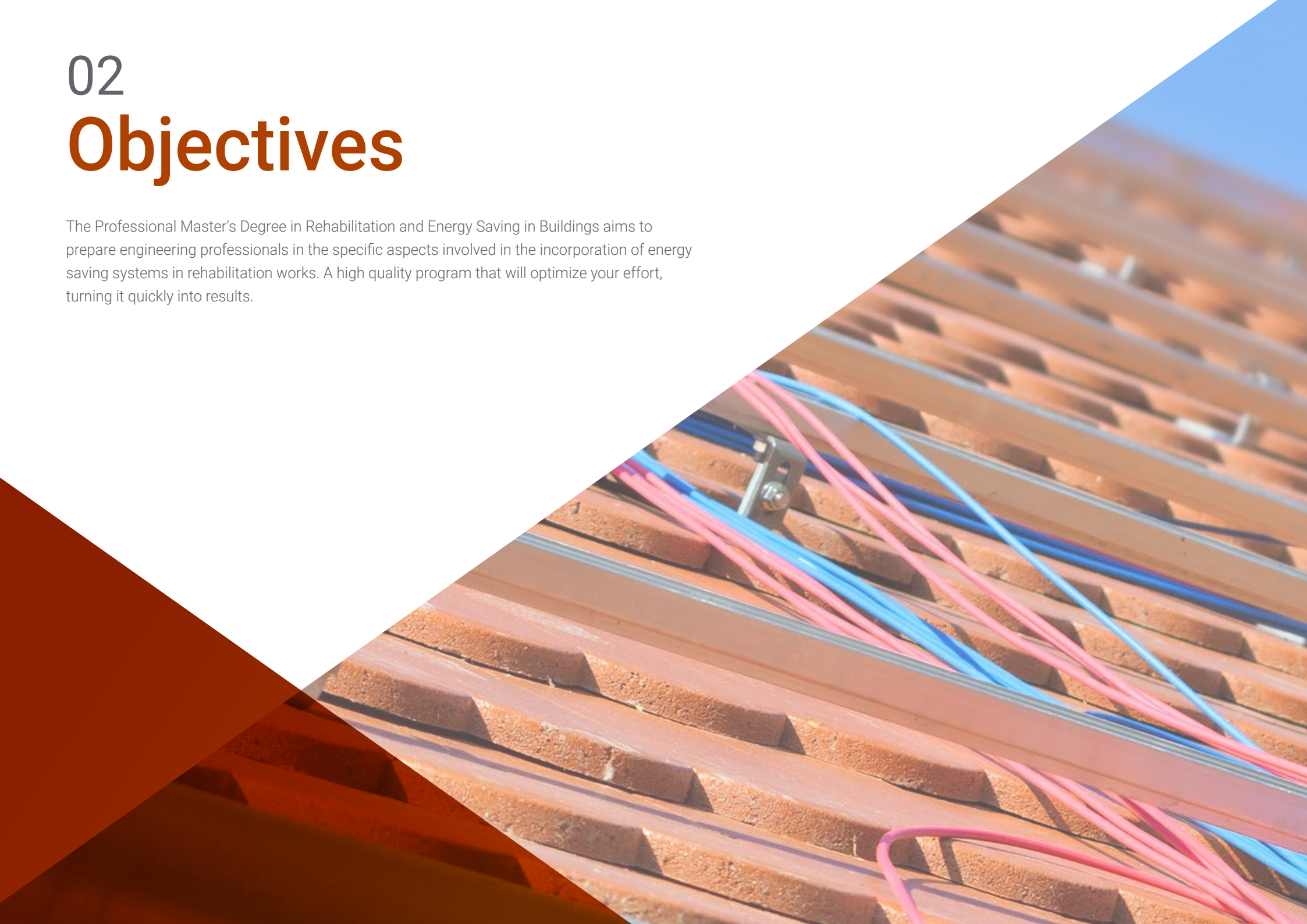
An immersive experience, which will provide you with a faster integration and a much more realistic view of the contents through the observation of experts acting on the subject studied.

Include in your knowledge, the exhaustive analysis of real success cases, in a contextual and direct learning.

02

Objectives

The Professional Master's Degree in Rehabilitation and Energy Saving in Buildings aims to prepare engineering professionals in the specific aspects involved in the incorporation of energy saving systems in rehabilitation works. A high quality program that will optimize your effort, turning it quickly into results.



The objective of this Professional Master's Degree is to form competent professionals in the design and application of energy saving systems that respond to the current requirements of the sector"

General Objectives

- Undertake the particularities to correctly manage the design, project, construction and execution of Energy Rehabilitation Works (Existing Buildings) and Energy Saving (New Buildings)
- Interpret the current regulatory framework based on current regulations and the possible criteria to be implemented for energy efficiency in buildings
- Discover the potential business opportunities offered by the knowledge of the various energy efficiency measures, from studying tenders and technical tenders for construction contracts, projecting buildings, analyzing and directing the works, managing, coordinating and planning the development of Energy Saving and Rehabilitation Projects
- Ability to analyze building maintenance programs developing the study of appropriate energy saving measures to be implemented according to technical requirements
- Delve into the latest trends, technologies and techniques in the field of Energy Efficiency in the Construction of Buildings

Specific Objectives

Module 1. Energy Rehabilitation of Existing Buildings

- Master the main concepts of the methodology to be followed in the development of an energy rehabilitation study analysis according to the criteria to be implemented
- Interpret the pathologies of foundations, roofs, facades and exterior slabs, carpentry and glazing, as well as installations, developing the study of Energy Rehabilitation of an existing building, from data collection, analysis and evaluation, study of the different proposals for improvement and conclusions, study of technical regulations of application
- Establish the guidelines that must be taken into account in the development of energy rehabilitation interventions in historic buildings, from data collection, analysis and evaluation, study of the different proposals for improvement and conclusions, study of the technical regulations applicable
- Acquire the necessary knowledge to develop an economic study of energy rehabilitation based on the analysis of the cost, execution times, the conditions of specialization of the works, the guarantees and specific tests to be requested
- Elaborate an assessment of the appropriate energy rehabilitation intervention and its alternatives based on the analysis of the different intervention options, based on the analysis of costs based on amortization, the correct selection of objectives, as well as a final extract with the possible courses of action

Module 2. Energy Saving in New Buildings

- Know the building categories, an analysis of the constructive solutions and objectives to be achieved, as well as the elaboration of a cost study of the various intervention proposals
- Interpret the possible pathologies of new buildings based to study of foundations, roofs, facades and exterior slabs, carpentry and glazing, as well as installations, developing the complete energy rehabilitation study from data collection, analysis and evaluation, es study of the different improvement proposals and conclusions, study of the applicable technical regulations
- Establish the guidelines that must be taken into account in the development of new building interventions with energy saving in singular buildings, from data collection, analysis and evaluation, study of the different improvement proposals and conclusions, study of technical regulations of application
- Acquire the necessary knowledge to develop an economic study of New Construction with Energy Saving based on the analysis of the cost, execution times, the conditions of specialization of the works, the guarantees and specific tests to be requested
- Elaborate an assessment of the appropriate intervention of a New Energy Efficiency Building intervention and its alternatives based on the analysis of the different intervention options, based on the analysis of costs based on amortization, the correct selection of objectives, as well as a final extract with the possible courses of action

Module 3. Energy Audit

- Discuss in detail the scope of an energy audit, the fundamental general concepts, objectives and analysis methodology
- Analyze the energy diagnosis based on the analysis of the envelope and systems, the analysis of consumption and energy accounting, the proposal of renewable energies to be implemented, as well as the proposal of various consumption control systems
- Analyze the benefits of an Energy Audit based on energy consumption, energy costs, environmental improvements, competitiveness improvements and building maintenance improvements
- Establish the guidelines that must be taken into account in the development of the energy audit such as the request of previous documentation of planimetries and invoices, visits to the building in operation, as well as the necessary equipment
- Gather previous information about the building to be audited based on general data, planimetries, previous projects, list of installations and technical data sheets, as well as energy invoices
- Elaborate preliminary data collection procedures with energy inventory, construction aspects, systems and installations, electrical measurements and operating conditions
- Interpret the analysis and evaluation of the envelope, systems and installations, the different options for action, energy balances and energy accounting of the building
- Develop a program of improvement proposals based on the energy supply and demand of the building, the type of action to be carried out, the optimization of the envelope and the systems and installations, as well as develop a final report that concludes the study developed
- Plan the development costs of the Energy Audit based on the scale of the building to be analyzed
- Delve into the current regulations and future forecasts in energy matters that condition the implementation of the measures proposed in the energy audit

Module 4. Energy Savings in Airtightness

- Delve into the scope of the envelope study, such as parameters related to materials, thicknesses, conductivity, transmittance and as basic technical conditions to analyze the energy performance of a building
- Interpret the possible energy improvements based on the study of the energy optimization of foundations, roofs, facades and exterior slabs (floors and ceilings), as well as basement walls in contact with the building, developing the study from data collection, analysis and assessment, study of the different proposals for improvement and conclusions, study of technical regulations of application
- Approach singular encounters of the thermal envelope such as installation skids and chimneys
- Acquire the knowledge of the study of the envelope in singular prefabricated constructions
- Plan and control the correct execution by means of a thermographic study according to the materials, their layout, development of the thermographic analysis, and study of the solutions to be implemented

Module 5. Energy Savings in Windows and Glazing

- Master the fundamental concepts of the scope of the study of window and door frames, such as parameters relating to materials (single or mixed material solutions), technical justifications and various innovative solutions depending on the nature of the building
- Interpret possible energy improvements based on the study of the technical characteristics of the windows and doors, such as transmittance, air permeability, water tightness and wind resistance
- Cover in detail the scope of the study of glazing types and the composition of composite glazing, such as parameters related to their properties, technical justifications and various innovation solutions depending on the nature of the building
- Acquire knowledge of the different types of sun protection based on their layout and technical justifications, as well as unique solutions
- Discover the new proposals for high-energy performance windows and glazing energy performance

Module 6. Energy Savings in Thermal Bridges

- Delve into the fundamental concepts of the scope of the study of possible thermal bridges, such as parameters related to the definition, application regulations, technical justifications and various innovation solutions depending on the nature of the building
- Approach the analysis of each thermal bridge based on the nature of the type, so we will develop the constructive thermal bridges, the geometric ones, the ones due to material change
- Analyze the possible singular thermal bridges of the building: the window, the arched roof, the column and the slab
- Plan and control the correct execution based on the study of possible thermal bridges through thermography, specifying the thermographic equipment, the working conditions, the detection of encounters to be corrected and subsequent analysis of solutions
- Analyze the different thermal bridge calculation tools: Therm, Cypetherm HE plus and Flixo

Module 7. Energy Savings in Airtightness

- Delve into the scope of the airtightness study, such as parameters related to the definition, application regulations, technical justifications and various innovation solutions depending on the nature of the building
- Interpret the possible energy improvements based on the study of the energy optimization of airtightness in on the intervention in the envelope and in the installations
- Interpret the development of the various pathologies that can occur when building airtightness is not taken into account: condensation, humidity, efflorescence, high energy consumption, poor comfort, etc...

- Address the technical requirements based on different technical solutions in order to optimize comfort, indoor air quality and noise protection
- Plan and control the correct execution based on the required thermography tests, smoke tests and Blower-Door test

Module 8. Energy Saving in Facilities

- Delve into the study of the scope of the study of air conditioning installations, such as parameters relating to the definition, application regulations, technical justifications and various innovative solutions depending on the nature of the building
- Delve into the study of aerothermal installations, such as definition parameters, application standards, technical justifications and various innovative solutions depending on the nature of the building
- You will acquire detailed knowledge in the study of ventilation installations with heat recovery, such as parameters related to the definition, application regulations, technical justifications and various innovative solutions depending on the nature of the building
- Select the type of boiler and pumps with high energy efficiency and air conditioning through radiant floors and ceilings based on the applicable regulations, technical justifications and various innovative solutions depending on the nature of the building
- Discover the installation opportunities of the Free-cooling system by analyzing its definition, application regulations, technical justifications and various innovation solutions depending on the nature of the building
- Analyze energy-efficient building lighting and conveyor systems
- Plan and control the construction of appropriate solar thermal and photovoltaic systems
- Know the operation of the building's energy consumption control systems by means of home automation and Best Management System (BMS)

Module 9. International Sustainability and Practical Examples of Retrofitting and Energy Savings

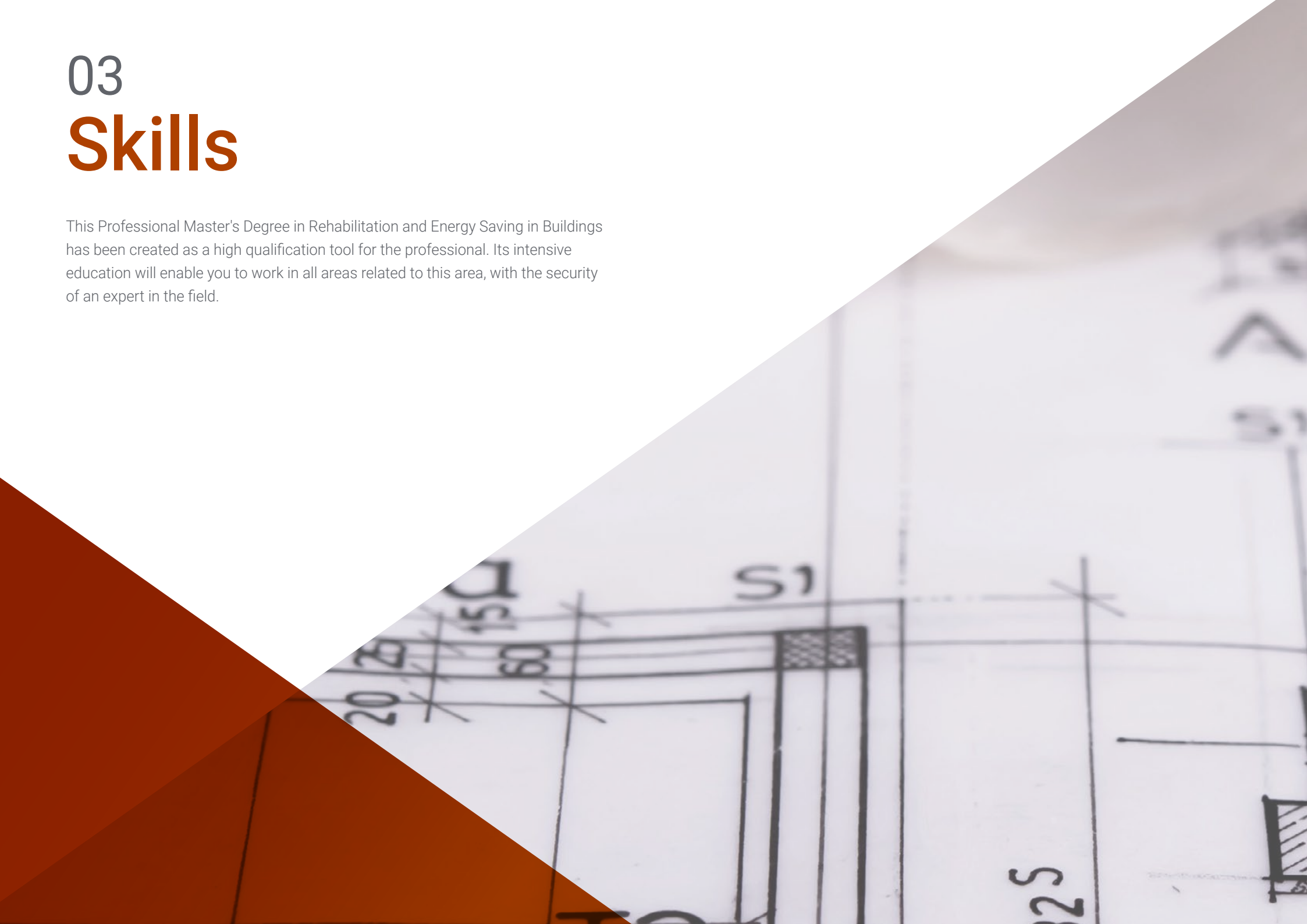
- Delve into the scope of the International Sustainability and Energy Efficiency Certifications, as well as the current Zero/Zero Energy Certifications
- Discuss in detail the LEED, BREEAM and GREEN sustainability certifications, the origins, types of certifications, certification levels, as well as the criteria to be implemented
- Learn about LEED ZERO Certification, its origin, certification levels, criteria to be implemented and development framework
- Discuss in detail the Passivhaus, EnePHit, Minergie and NZEB certifications, the origins, the certification levels, the criteria to be implemented and the framework for the development of nearly zero/zero energy buildings
- Learn more about WELL Certification, its origin, certification levels, criteria to be implemented and development framework

A path to achieve specialization and professional growth that will propel you towards a greater level of competitiveness in the employment market"

03

Skills

This Professional Master's Degree in Rehabilitation and Energy Saving in Buildings has been created as a high qualification tool for the professional. Its intensive education will enable you to work in all areas related to this area, with the security of an expert in the field.



Acquire the ability to plan and implement the most efficient energy saving systems on the market, learning with the quality of a high impact program"

General Skill

- Acquire the necessary skills for the professional practice of computer engineering with the knowledge of all the necessary factors to carry it out it with quality and solvency

Up-to-date, comprehensive, intensive and flexible: this program will allow you to advance unimpeded to the highest working capacity in this field"

Specific Skills

- Design retrofit projects for existing buildings under strict energy efficiency criteria
- Design energy saving projects for new buildings under strict energy efficiency criteria
- Coordinate and plan the development of refurbishment and energy saving projects
- Work as construction manager of energy saving and retrofit projects
- Manage execution and installation departments of construction companies specialized in energy efficiency
- Bidding and preparing tenders for the award of construction contracts for energy rehabilitation and energy saving works
- Develop, coordinate and plan building maintenance programs and establish the optimal intervention measures in accordance with established technical criteria, giving priority to energy demand reduction
- Access to management positions in the energy resources business areas of companies in the sector
- Qualify as a specialist in energy-efficient energy retrofit construction
- Qualify as a specialist in the construction of energy-efficient new buildings
- Qualify as a specialist in building energy advisor

04

Course Management

Within the concept of total quality of our Professional Master's Degree, TECH is proud to put at your disposal a teaching staff of the highest level, chosen for their proven experience. Professionals from different areas and fields of expertise that make up a complete, multidisciplinary team. A unique opportunity to learn from the best.

A program created and taught by specialists in this field of work that will give you a close and real vision of this profession, bringing you closer to it in a realistic and direct way"

Management

Ms. Peña Serrano, Ana Belén

- Content writer on renewable energies and energy efficiency for leading technical magazines and websites
- Technical Engineering in Topography by the Polytechnic University of Madrid
- Professional Master's Degree in Renewable Energies from San Pablo CEU University
- Qualifying education in Wind Energy Installations by LevelCOM Formación
- Energy Certification of Buildings by Fundación Laboral de la Construcción
- Geological Cartography by the National University of Distance Education
- Collaborates in different scientific communication projects, directing the dissemination of engineering and energy in different media
- Director of renewable energy projects of the Professional Master's Degree in Environmental and Energy Management in Organizations of the UNIR
- Teacher of the Professional Master's Degree in Energy Saving and Sustainability in Buildings and several other programs at TECH-Technological University

Professors

Mr. Almenara Rodríguez, José Luís

- MEP Production Manager. Bridges and roadways infrastructures S.L
- Operation Manager. Sociedad Concesionaria Hospital de Parla
- Quality and Production Manager. Sacyr
- Quality Manager. Constructora Hispánica
- Quality Manager. AZVIAZVI, Barcelona
- Project Technician. Reins Diseño S.L.
- Technical Industrial Chemical Engineering. Polytechnic University of Catalonia
- Advanced Course in Safety Management. Prosulting. Rey Juan Carlos University
- Specialization Course in Photovoltaic Solar Energy by the Polytechnic University of Catalonia
- Expert Course in Energy Management of Buildings and Facilities. Structuralia
- Energy Certification and External Control Course. Structuralia
- Course on Water Management and Control in Industry. Stenco

Ms. Martínez Cerro, María del Mar

- Research Support Technician at the UCLM
- Building Engineering from the Polytechnic University of Cuenca
- Postgraduate degree in Energy Simulation of Buildings from the University of Barcelona
- Specialist Technician in Delineation, Buildings and Works. San Juan de Albacete Vocational Training Institute
- Professional certificate 1712CPBIM01 BIM MODELER, specializing in MEP facility modeling
- Her professional career has been developed in the field of building energy analysis, performing simulations and energy comparisons oriented to sustainable solutions in buildings
- She has collaborated in several technological and educational projects at the Universidad of Castilla– La Mancha
- She is editor of technical and educational contents on energy certification of buildings

Mr. Peñarrubia Ramírez, Álvaro

- Specialist in renewable energies and energy efficiency in building construction
- Technical Industrial Electronic Engineering from the University of Castilla– La Mancha
- Professional Master's Degree in Thermal and Electrical Installations Energy Efficiency Energy Efficiency at Miguel Hernández University
- Course of Photovoltaic Installations of self-consumption of power <100kW by the Official College of Technical Engineers of Albacete
- Course of Energy Auditor in Industry. R.D. 56/2016 by the School of Business School FED
- He has worked in various fields of engineering, such as electronic security, home automation, telecommunications, railway electrification, programming and the beverage bottling industry. In addition, he has coordinated R&D&I projects

Ms. Rodríguez Jordán, Daniela

- Architect in the Support Program for the National Early Childhood Plan
- Specialist in Eco-efficient Building Rehabilitation and use of BIM. EMVISESA
- Developer of high-rise housing developments. One at a time
- Management of municipal procedures and urban code consultancy
- Design studio dedicated to interior design. Maso Studio
- Architecture FADU, UBA
- Si Fadu Project. Research topic: Sustainability in existing buildings in CABA FADU, UBA
- Eco-efficient Rehabilitation of Buildings and Neighborhoods. Professional Master's Degree - University of Seville

05

Structure and Content

The contents of this Professional Master's Degree have been developed by the different experts participating in it, with a clear purpose: to ensure that our students acquire each and every one of the skills necessary to become true experts in this field. A complete and well-structured program that will take you to the highest standards of quality and success.

A comprehensive teaching program, structured in well-developed teaching units, oriented towards learning that is compatible with your personal and professional life"

Module 1. Energy Rehabilitation of Existing Buildings

1.1. Methodology
- 1.1.1. Main Concepts
- 1.1.2. Establishment of Building Categories
- 1.1.3. Analysis of Construction Pathologies
- 1.1.4. Analysis of the Objectives of the Regulations

1.2. Study of Pathologies of Foundations of Existing Buildings
- 1.2.1. Data Collection
- 1.2.2. Analysis and Evaluation
- 1.2.3. Proposals for Improvement and Conclusions
- 1.2.4. Technical Regulations

1.3. Study of Roof Pathologies in Existing Buildings
- 1.3.1. Data Collection
- 1.3.2. Analysis and Evaluation
- 1.3.3. Proposals for Improvement and Conclusions
- 1.3.4. Technical Regulations

1.4. Studies of Pathologies of Facades of Existing Buildings
- 1.4.1. Data Collection
- 1.4.2. Analysis and Evaluation
- 1.4.3. Proposals for Improvement and Conclusions
- 1.4.4. Technical Regulations

1.5. Studies of Pathologies of Exterior Floor Slabs of Existing Buildings
- 1.5.1. Data Collection
- 1.5.2. Analysis and Evaluation
- 1.5.3. Proposals for Improvement and Conclusions
- 1.5.4. Technical Regulations

1.6. Studies of Pathologies of Carpentry and Glazing in Existing Buildings
- 1.6.1. Data Collection
- 1.6.2. Analysis and Evaluation
- 1.6.3. Proposals for Improvement and Conclusions
- 1.6.4. Technical Regulations

1.7. Analysis of Existing Building Installations
- 1.7.1. Data Collection
- 1.7.2. Analysis and Evaluation
- 1.7.3. Proposals for Improvement and Conclusions
- 1.7.4. Technical Regulations

1.8. Study of Energy Rehabilitation Interventions in Historic Buildings
- 1.8.1. Data Collection
- 1.8.2. Analysis and Evaluation
- 1.8.3. Proposals for Improvement and Conclusions
- 1.8.4. Technical Regulations

1.9. Economic Study of Energy Rehabilitation
- 1.9.1. Cost Analysis
- 1.9.2. Time Analysis
- 1.9.3. Specialization of the Works
- 1.9.4. Guarantees and Specific Tests

1.10. Evaluation of Appropriate Intervention and Alternatives
- 1.10.1. Analysis of the Different Intervention Options
- 1.10.2. Cost Analysis Based on Amortization
- 1.10.3. Target Selection
- 1.10.4. Final Assessment of the Selected Intervention

Module 2. Energy Saving in New Buildings

2.1. Methodology
- 2.1.1. Establishment of Building Categories
- 2.1.2. Analysis of Construction Solutions
- 2.1.3. Analysis of the Objectives of the Regulations
- 2.1.4. Elaboration of the Cost of the Intervention Proposals

2.2. Foundation Studies for New Construction
- 2.2.1. Type of Action
- 2.2.2. Analysis and Evaluation
- 2.2.3. Intervention Proposals and Conclusions
- 2.2.4. Technical Regulations

2.3. Studies of New Construction Roofs
- 2.3.1. Type of Action
- 2.3.2. Analysis and Evaluation
- 2.3.3. Intervention Proposals and Conclusions
- 2.3.4. Technical Regulations

2.4. Studies of New Building Facades
- 2.4.1. Type of Action
- 2.4.2. Analysis and Evaluation
- 2.4.3. Intervention Proposals and Conclusions
- 2.4.4. Technical Regulations

2.5. Studies of Exterior Floor Slabs in New Buildings
- 2.5.1. Type of Action
- 2.5.2. Analysis and Evaluation
- 2.5.3. Intervention Proposals and Conclusions
- 2.5.4. Technical Regulations

2.6. Studies of Carpentry and Glazing of New Buildings
- 2.6.1. Type of Action
- 2.6.2. Analysis and Evaluation
- 2.6.3. Intervention Proposals and Conclusions
- 2.6.4. Technical Regulations

2.7. Analysis of New Construction Installations
- 2.7.1. Type of Action
- 2.7.2. Analysis and Evaluation
- 2.7.3. Intervention Proposals and Conclusions
- 2.7.4. Technical Regulations

2.8. Studies of Options for Energy Saving Measures in Singular Buildings
- 2.8.1. Type of Action
- 2.8.2. Analysis and Evaluation
- 2.8.3. Intervention Proposals and Conclusions
- 2.8.4. Technical Regulations

2.9. Economic Study of the Different Alternatives for Energy Saving in New Buildings
- 2.9.1. Cost Analysis
- 2.9.2. Time Analysis
- 2.9.3. Specialization of the Works
- 2.9.4. Guarantees and Specific Tests

2.10. Evaluation of the Appropriate Solution and Alternatives
- 2.10.1. Analysis of the Different Intervention Options
- 2.10.2. Cost Analysis Based on Amortization
- 2.10.3. Target Selection
- 2.10.4. Final Assessment of the Selected Intervention

Module 3. Energy Audit

3.1. The Scope of an Energy Audit
- 3.1.1. Main Concepts
- 3.1.2. Objectives
- 3.1.3. The Scope of an Energy Audit
- 3.1.4. The Methodology of an Energy Audit

3.2. Energy Diagnosis
- 3.2.1. Analysis of the Enclosure Vs. Systems and Installations
- 3.2.2. Consumption Analysis and Energy Accounting
- 3.2.3. Renewable Energy Proposals
- 3.2.4. Proposals for Home Automation Systems, Remote Management Automation

3.3. Benefits of an Energy Audit
- 3.3.1. Energy Consumption and Energy Costs
- 3.3.2. Environmental Improvement
- 3.3.3. Improved Competitiveness
- 3.3.4. Improved Maintenance

3.4. Development Methodology
- 3.4.1. Previous Documentation Request. Planimetry
- 3.4.2. Previous Documentation Request. Invoices
- 3.4.3. Visits to the Building in Operation
- 3.4.4. Necessary Equipment

3.5. Information Gathering
- 3.5.1. General Data
- 3.5.2. Planimetries
- 3.5.3. Projects. List of Installations
- 3.5.4. Technical Data Sheets. Energy Invoicing

3.6. Data Collection
- 3.6.1. Energy Inventory
- 3.6.2. Construction Aspects
- 3.6.3. Systems and Installations
- 3.6.4. Electrical Measurements and Operating Conditions

3.7. Analysis and Evaluation
- 3.7.1. Envelope Analysis
- 3.7.2. Analysis of Systems and Installations
- 3.7.3. Evaluation of Performance Options
- 3.7.4. Energy Balances and Accounting

3.8. Proposals for Improvement and Conclusions
- 3.8.1. Energy Supply/Demand
- 3.8.2. Type of Action to be Taken
- 3.8.3. Envelope and Systems and Installations
- 3.8.4. Final Report

3.9. Economic Appraisal Vs. Scope
- 3.9.1. Cost of Housing Audit
- 3.9.2. Cost of Residential Building Audit
- 3.9.3. Cost of Tertiary Building Audit
- 3.9.4. Audit Cost of Shopping Center

3.10. Current Regulations
- 3.10.1. National Energy Efficiency Plan
- 3.10.2. Standard UNE 16247:2012. Energy Audits. Requirements
- 3.10.3. Cop 21. Directive 2012/27/EU
- 3.10.4. Cop 25. Chile-Madrid

Module 4. Energy Savings in Airtightness

4.1. Main Concepts
- 4.1.1. Materials
- 4.1.2. Thicknesses
- 4.1.3. Conductivity
- 4.1.4. Transmittance

4.2. Foundation Insulation
- 4.2.1. Materials
- 4.2.2. Layout
- 4.2.3. Technical Justifications
- 4.2.4. Innovation Solutions

4.3. Facade Insulation
- 4.3.1. Materials
- 4.3.2. Layout
- 4.3.3. Technical Justifications
- 4.3.4. Innovation Solutions

4.4. Roof Insulation
- 4.4.1. Materials
- 4.4.2. Layout
- 4.4.3. Technical Justifications
- 4.4.4. Innovation Solutions

4.5. Floor Slab Insulation: Floors
- 4.5.1. Materials
- 4.5.2. Layout
- 4.5.3. Technical Justifications
- 4.5.4. Innovation Solutions

4.6. Floor Slab Insulation: Ceilings
- 4.6.1. Materials
- 4.6.2. Layout
- 4.6.3. Technical Justifications
- 4.6.4. Innovation Solutions

4.7. Basement Wall Insulation
- 4.7.1. Materials
- 4.7.2. Layout
- 4.7.3. Technical Justifications
- 4.7.4. Innovation Solutions

4.8. Installation Skids Vs. Chimneys
- 4.8.1. Materials
- 4.8.2. Layout
- 4.8.3. Technical Justifications
- 4.8.4. Innovation Solutions

4.9. Envelope in Prefabricated Buildings
- 4.9.1. Materials
- 4.9.2. Layout
- 4.9.3. Technical Justifications
- 4.9.4. Innovation Solutions

4.10. Innovation Solutions
- 4.10.1. Thermography Analysis
- 4.10.2. Thermography According to Layout
- 4.10.3. Development of Thermographic Analysis
- 4.10.4. Solutions to be Implemented

Module 5. Energy Savings in Windows and Glazing

5.1. Types of Joinery
- 5.1.1. Single Material Solutions
- 5.1.2. Mixed Solutions
- 5.1.3. Technical Justifications
- 5.1.4. Innovation Solutions

5.2. Transmittance
- 5.2.1. Definition
- 5.2.2. Regulations
- 5.2.3. Technical Justifications
- 5.2.4. Innovation Solutions

5.3. Air Permeability
- 5.3.1. Definition
- 5.3.2. Regulations
- 5.3.3. Technical Justifications
- 5.3.4. Innovation Solutions

5.4. Water Tightness
- 5.4.1. Definition
- 5.4.2. Regulations
- 5.4.3. Technical Justifications
- 5.4.4. Innovation Solutions

5.5. Wind Resistance
- 5.5.1. Definition
- 5.5.2. Regulations
- 5.5.3. Technical Justifications
- 5.5.4. Innovation Solutions

5.6. Types of Glasses
- 5.6.1. Definition
- 5.6.2. Regulations
- 5.6.3. Technical Justifications
- 5.6.4. Innovation Solutions

5.7. Glass Composition
- 5.7.1. Definition
- 5.7.2. Regulations
- 5.7.3. Technical Justifications
- 5.7.4. Innovation Solutions

5.8. Solar Shading
- 5.8.1. Definition
- 5.8.2. Regulations
- 5.8.3. Technical Justifications
- 5.8.4. Innovation Solutions

5.9. High Energy Performance Joinery
- 5.9.1. Definition
- 5.9.2. Regulations
- 5.9.3. Technical Justifications
- 5.9.4. Innovation Solutions

5.10. High Energy Performance Glasses
- 5.10.1. Definition
- 5.10.2. Regulations
- 5.10.3. Technical Justifications
- 5.10.4. Innovation Solutions

Module 6. Energy Savings in Thermal Bridges

6.1. Main Concepts
- 6.1.1. Definition
- 6.1.2. Regulations
- 6.1.3. Technical Justifications
- 6.1.4. Innovation Solutions

6.2. Constructive Thermal Bridges
- 6.2.1. Definition
- 6.2.2. Regulations
- 6.2.3. Technical Justifications
- 6.2.4. Innovation Solutions

6.3. Geometric Thermal Bridges
- 6.3.1. Definition
- 6.3.2. Regulations
- 6.3.3. Technical Justifications
- 6.3.4. Innovation Solutions

6.4. Thermal Bridges due to Material Change
- 6.4.1. Definition
- 6.4.2. Regulations
- 6.4.3. Technical Justifications
- 6.4.4. Innovation Solutions

6.5. Analysis of Singular Thermal Bridges: The Window
- 6.5.1. Definition
- 6.5.2. Regulations
- 6.5.3. Technical Justifications
- 6.5.4. Innovation Solutions

6.6. Analysis of Singular Thermal Bridges: Capialization
- 6.6.1. Definition
- 6.6.2. Regulations
- 6.6.3. Technical Justifications
- 6.6.4. Innovation Solutions

6.7. Analysis of Singular Thermal Bridges: The Abutment
- 6.7.1. Definition
- 6.7.2. Regulations
- 6.7.3. Technical Justifications
- 6.7.4. Innovation Solutions

6.8. Analysis of Singular Thermal Bridges: The Floor Slab
- 6.8.1. Definition
- 6.8.2. Regulations
- 6.8.3. Technical Justifications
- 6.8.4. Innovation Solutions

6.9. Thermal Bridge Analysis with Thermography
- 6.9.1. Thermographic Equipment
- 6.9.2. Work Conditions
- 6.9.3. Detection of Encounters to be Corrected
- 6.9.4. Thermography in the Solution

6.10. Thermal Bridge Calculation Tools
- 6.10.1. *Therm*
- 6.10.2. *CYPETHERM he Plus*
- 6.10.3. *Flixo*
- 6.10.4. Case Study 1

Module 7. Energy Savings in Airtightness

7.1. Main Concepts
- 7.1.1. Definition of Tightness Vs. Watertightness:
- 7.1.2. Regulations
- 7.1.3. Technical Justifications
- 7.1.4. Innovation Solutions

7.2. Control of Airtightness in the Enclosure
- 7.2.1. Location
- 7.2.2. Regulations
- 7.2.3. Technical Justifications
- 7.2.4. Innovation Solutions

7.3. Tightness Control in Installations
- 7.3.1. Location
- 7.3.2. Regulations
- 7.3.3. Technical Justifications
- 7.3.4. Innovation Solutions

7.4. Pathologies
- 7.4.1. Condensations
- 7.4.2. Moisture
- 7.4.3. Energy Consumption
- 7.4.4. Low Comfort

7.5. Comfort
- 7.5.1. Definition
- 7.5.2. Regulations
- 7.5.3. Technical Justifications
- 7.5.4. Innovation Solutions

7.6. Indoor Air Quality
- 7.6.1. Definition
- 7.6.2. Regulations
- 7.6.3. Technical Justifications
- 7.6.4. Innovation Solutions

7.7. Noise Protection
- 7.7.1. Definition
- 7.7.2. Regulations
- 7.7.3. Technical Justifications
- 7.7.4. Innovation Solutions

7.8. Tightness Test: Thermography
- 7.8.1. Thermographic Equipment
- 7.8.2. Work Conditions
- 7.8.3. Detection of Encounters to be Corrected
- 7.8.4. Thermography in the Solution

7.9. Smoke Testing
- 7.9.1. Smoke Test Equipment
- 7.9.2. Work Conditions
- 7.9.3. Detection of Encounters to be Corrected
- 7.9.4. Smoke Test in the Solution

7.10. *Blower Door* Test
- 7.10.1. *Blower-Door* Test Equipment
- 7.10.2. Work Conditions
- 7.10.3. Detection of Encounters to be Corrected
- 7.10.4. *Blower-Door* Test in the Solution

Module 8. Energy Saving in Facilities

8.1. Air Conditioning Installations
- 8.1.1. Definition
- 8.1.2. Regulations
- 8.1.3. Technical Justifications
- 8.1.4. Innovation Solutions

8.2. Aerothermal Power
- 8.2.1. Definition
- 8.2.2. Regulations
- 8.2.3. Technical Justifications
- 8.2.4. Innovation Solutions

8.3. Ventilation with Heat Recovery
- 8.3.1. Definition
- 8.3.2. Regulations
- 8.3.3. Technical Justifications
- 8.3.4. Innovation Solutions

8.4. Selection of Energy-Efficient Boilers and Pumps
- 8.4.1. Definition
- 8.4.2. Regulations
- 8.4.3. Technical Justifications
- 8.4.4. Innovation Solutions

8.5. Air Conditioning Alternatives: Floor/Ceilings
- 8.5.1. Definition
- 8.5.2. Regulations
- 8.5.3. Technical Justifications
- 8.5.4. Innovation Solutions

8.6. *Free-Cooling* (Free Cooling by External Air)
- 8.6.1. Definition
- 8.6.2. Regulations
- 8.6.3. Technical Justifications
- 8.6.4. Innovation Solutions

8.7. Lighting and Transport Equipment
- 8.7.1. Definition
- 8.7.2. Regulations
- 8.7.3. Technical Justifications
- 8.7.4. Innovation Solutions

8.8. Solar Thermal Production
- 8.8.1. Definition
- 8.8.2. Regulations
- 8.8.3. Technical Justifications
- 8.8.4. Innovation Solutions

8.9. Solar Photovoltaic Production
- 8.9.1. Definition
- 8.9.2. Regulations
- 8.9.3. Technical Justifications
- 8.9.4. Innovation Solutions

8.10. Control Systems: Domotics and *Best Managenent Sysytem* (BMS)
- 8.10.1. Definition
- 8.10.2. Regulations
- 8.10.3. Technical Justifications
- 8.10.4. Innovation Solutions

Module 9. Building Energy Simulation Tools and Regulations

9.1. Current Regulations: New Technical Code CTE 2019
- 9.1.1. Definition
- 9.1.2. Regulations
- 9.1.3. Existing Buildings Vs. Newly Constructed Buildings
- 9.1.4. Competent Technicians for Energy Certification
- 9.1.5. Register of Energy Certificates

9.2. Differences Between CTE 2019 and CTE 2013
- 9.2.1. He-0 Limitation of Energy Consumption
- 9.2.2. He-1 Conditions for Energy Demand Control
- 9.2.3. He-3 Lighting Installation Conditions
- 9.2.4. He-4 Minimum Contribution of Renewable Energy to Cover Domestic Hot Water Demand
- 9.2.5. He-5 Minimum Generation of Electrical Energy

9.3. Unified Energy Certification Tool Lider-Calener
- 9.3.1. HULC Tool
- 9.3.2. Installation.
- 9.3.3. Settings
- 9.3.4. Scope
- 9.3.5. Example of Certification with Unified Tool Lider-Calener

9.4. CE3X Energy Certification Program
- 9.4.1. CE3X Program
- 9.4.2. Installation
- 9.4.3. Settings
- 9.4.4. Scope

9.5. CE3 Energy Certification Program
- 9.5.1. CE3 Program
- 9.5.2. Installation
- 9.5.3. Settings
- 9.5.4. Scope

9.6. CERMA Energy Certification Program
- 9.6.1. CERMA Program
- 9.6.2. Installation
- 9.6.3. Settings
- 9.6.4. Scope

9.7. CYPETHERM 2020C Energy Certification Program
- 9.7.1. CYPETHERM HE Plus 2020C
- 9.7.2. Installation
- 9.7.3. Settings
- 9.7.4. Scope

9.8. SG SAVE Energy Certification Program
- 9.8.1. SG SAVE Program
- 9.8.2. Installation
- 9.8.3. Settings
- 9.8.4. Scope

9.9. Practical Example of Energy Certification with Simplified CE3X Procedure for an Existing Building
- 9.9.1. Building Location
- 9.9.2. Description of the Building Envelope
- 9.9.3. Description of the Systems
- 9.9.4. Energy Consumption Analysis

9.10. Practical Example of Energy Certification with the Unified Tool Lider-Calener for a New Construction Building
- 9.10.1. Building Location
- 9.10.2. Description of the Building Envelope
- 9.10.3. Description of the Systems
- 9.10.4. Energy Consumption Analysis

Module 10. International Sustainability, Energy Efficiency and Comfort Certifications

10.1. The Future of Energy Saving in Buildings: Sustainability and Energy Efficiency Certifications
- 10.1.1. Sustainability Vs. Energy Efficiency
- 10.1.2. Evolution of Sustainability
- 10.1.3. Types of Certifications
- 10.1.4. The Future of Certifications

10.2. LEED Certification
- 10.2.1. Origin of the Standard
- 10.2.2. Types of LEED Certifications
- 10.2.3. Levels of Certification
- 10.2.4. Criteria to be Implemented

10.3. LEED Zero Certification
- 10.3.1. Origin of the Standard
- 10.3.2. LEED Zero Resources
- 10.3.3. Criteria to be Implemented
- 10.3.4. Zero Energy Buildings

10.4. BREEAM Certification
- 10.4.1. Origin of the Standard
- 10.4.2. Types of BREEAM Certifications
- 10.4.3. Levels of Certification
- 10.4.4. Criteria to be Implemented

10.5. Green Certification
- 10.5.1. Origin of the Standard
- 10.5.2. Types of Green Certifications
- 10.5.3. Levels of Certification
- 10.5.4. Criteria to be Implemented

10.6. The Passivhaus Standard and its Application in Nearly Zero/Zero Energy Buildings
- 10.6.1. Origin of the Standard
- 10.6.2. Passivhaus Certification Levels
- 10.6.3. Criteria to be Implemented
- 10.6.4. Zero Energy Buildings

10.7. The EnerPHit Standard and its Application in Nearly Zero/Zero Energy Buildings
- 10.7.1. Origin of the Standard
- 10.7.2. EnerPHit Certification Levels
- 10.7.3. Criteria to be Implemented
- 10.7.4. Zero Energy Buildings

10.8. The Minergie Standard and its Application in Nearly Zero/Zero Energy Buildings
- 10.8.1. Origin of the Standard
- 10.8.2. Minergie Certification Levels
- 10.8.3. Criteria to be Implemented
- 10.8.4. Zero Energy Buildings

10.9. The nZEB Standard and its Application in Nearly Zero/Zero Energy Buildings
- 10.9.1. Origin of the Standard
- 10.9.2. Levels of nZEB Certification
- 10.9.3. Criteria to be Implemented
- 10.9.4. Zero Energy Buildings

10.10. WELL Certification
- 10.10.1. Origin of the Standard
- 10.10.2. Types of BREEAM Certifications
- 10.10.3. Levels of Certification
- 10.10.4. Criteria to be Implemented

06

Methodology

This academic program offers students a different way of learning. Our methodology uses a cyclical learning approach: **Relearning.**

This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** have considered it to be one of the most effective.

Discover Relearning, a system that abandons conventional linear learning, to take you through cyclical teaching systems: a way of learning that has proven to be extremely effective, especially in subjects that require memorization"

Case Study to contextualize all content

Our program offers a revolutionary approach to developing skills and knowledge. Our goal is to strengthen skills in a changing, competitive, and highly demanding environment.

At TECH, you will experience a learning methodology that is shaking the foundations of traditional universities around the world"

You will have access to a learning system based on repetition, with natural and progressive teaching throughout the entire syllabus.

The student will learn to solve complex situations in real business environments through collaborative activities and real cases.

A learning method that is different and innovative

This TECH program is an intensive educational program, created from scratch, which presents the most demanding challenges and decisions in this field, both nationally and internationally. This methodology promotes personal and professional growth, representing a significant step towards success. The case method, a technique that lays the foundation for this content, ensures that the most current economic, social and professional reality is taken into account.

> *Our program prepares you to face new challenges in uncertain environments and achieve success in your career"*

The case method is the most widely used learning system in the best faculties in the world. The case method was developed in 1912 so that law students would not only learn the law based on theoretical content. It consisted of presenting students with real-life, complex situations for them to make informed decisions and value judgments on how to resolve them. In 1924, Harvard adopted it as a standard teaching method.

What should a professional do in a given situation? This is the question that you are presented with in the case method, an action-oriented learning method. Throughout the program, the studies will be presented with multiple real cases. They will have to combine all their knowledge and research, and argue and defend their ideas and decisions.

Relearning Methodology

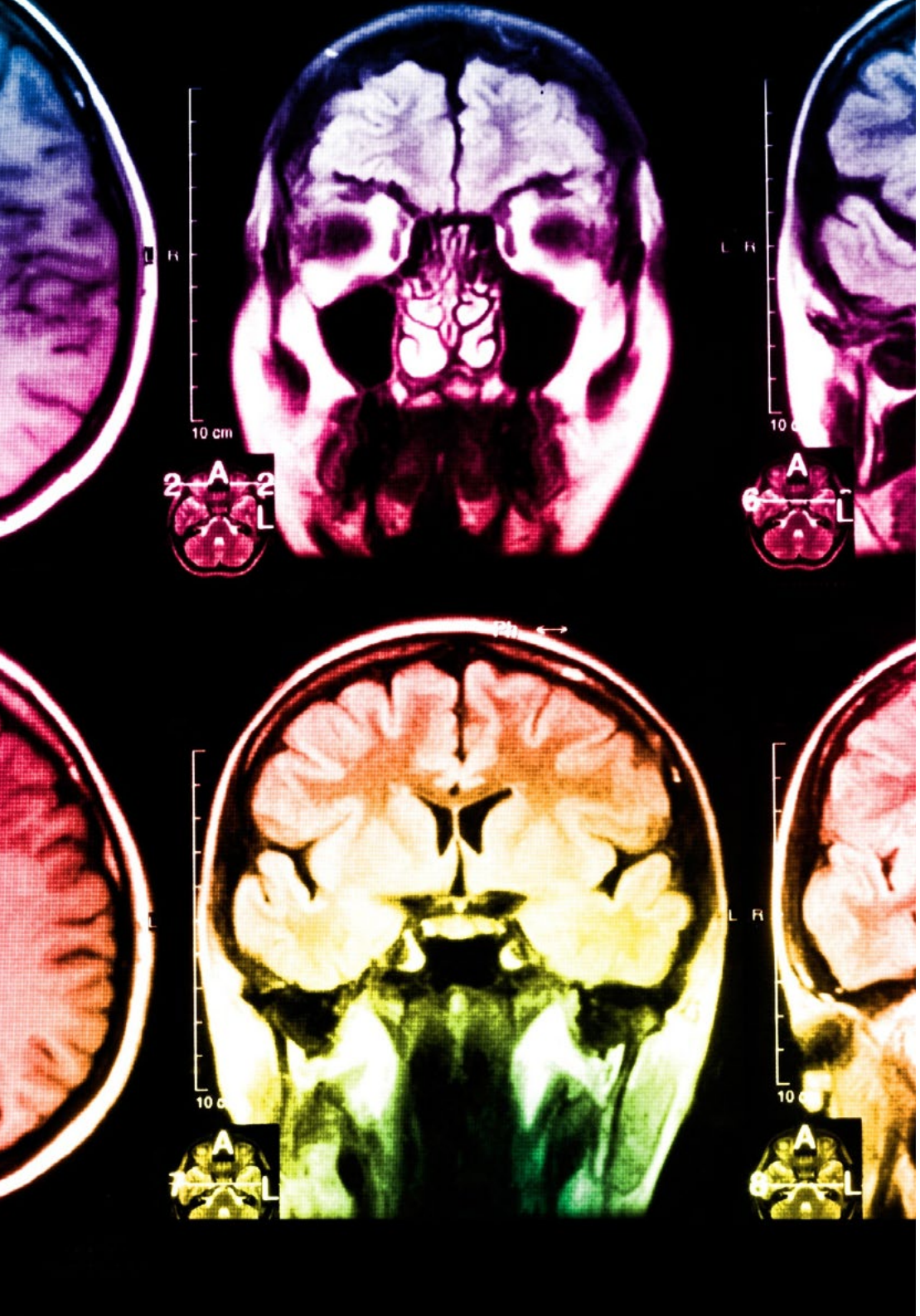
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines 8 different teaching elements in each lesson.

We enhance the Case Study with the best 100% online teaching method: Relearning.

In 2019, we obtained the best learning results of all online universities in the world.

At TECH, you will learn using a cutting-edge methodology designed to train the executives of the future. This method, at the forefront of international teaching, is called Relearning.

Our university is the only one in the world authorized to employ this successful method. In 2019, we managed to improve our students' overall satisfaction levels (teaching quality, quality of materials, course structure, objectives...) based on the best online university indicators.



In our program, learning is not a linear process, but rather a spiral (learn, unlearn, forget, and re-learn). Therefore, we combine each of these elements concentrically. This methodology has trained more than 650,000 university graduates with unprecedented success in fields as diverse as biochemistry, genetics, surgery, international law, management skills, sports science, philosophy, law, engineering, journalism, history, and financial markets and instruments. All this in a highly demanding environment, where the students have a strong socio-economic profile and an average age of 43.5 years.

Relearning will allow you to learn with less effort and better performance, involving you more in your training, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation for success.

From the latest scientific evidence in the field of neuroscience, not only do we know how to organize information, ideas, images and memories, but we know that the place and context where we have learned something is fundamental for us to be able to remember it and store it in the hippocampus, to retain it in our long-term memory.

In this way, and in what is called neurocognitive context-dependent e-learning, the different elements in our program are connected to the context where the individual carries out their professional activity.

This program offers the best educational material, prepared with professionals in mind:

Study Material

All teaching material is produced by the specialists who teach the course, specifically for the course, so that the teaching content is highly specific and precise.

These contents are then applied to the audiovisual format, to create the TECH online working method. All this, with the latest techniques that offer high quality pieces in each and every one of the materials that are made available to the student.

Classes

There is scientific evidence suggesting that observing third-party experts can be useful.

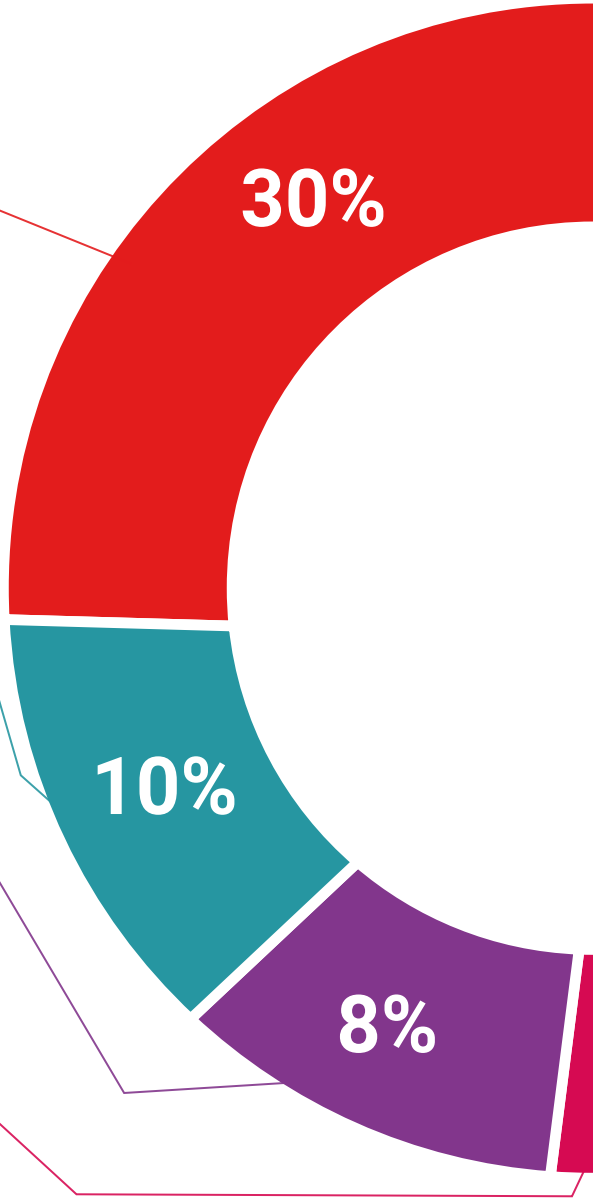
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

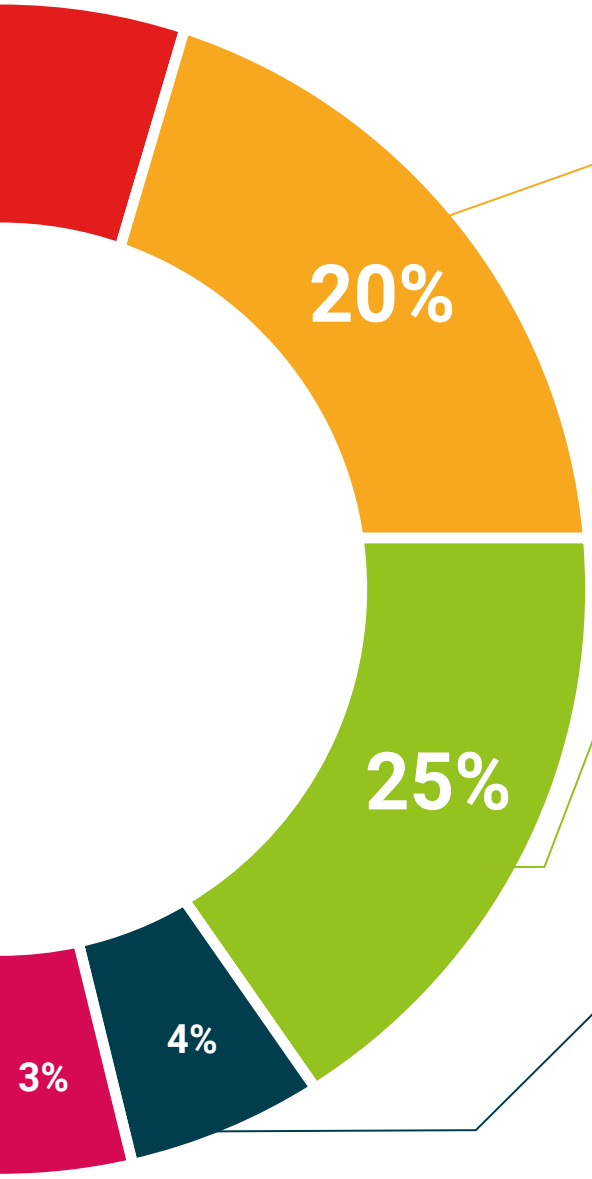
Practising Skills and Abilities

They will carry out activities to develop specific skills and abilities in each subject area. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop in the context of the globalization that we are experiencing.

Additional Reading

Recent articles, consensus documents and international guidelines, among others. In TECH's virtual library, students will have access to everything they need to complete their course.





Case Studies

Students will complete a selection of the best case studies chosen specifically for this program. Cases that are presented, analyzed, and supervised by the best specialists in the world.

Interactive Summaries

The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".

Testing & Retesting

We periodically evaluate and re-evaluate students' knowledge throughout the program, through assessment and self-assessment activities and exercises, so that they can see how they are achieving their goals.

07

Certificate

The Professional Master's Degree in Rehabilitation and Energy Saving in Buildings guarantees students, in addition to the most rigorous and up-to-date education, access to a Professional Master's Degree diploma issued by TECH Technological University.

Successfully complete this program and receive your university qualification without having to travel or fill out laborious paperwork"

This **Professional Master's Degree in Rehabilitation and Energy Saving in Buildings** contains the most complete and up-to-date scientific on the market.

After the student has passed the assessments, they will receive their corresponding **Professional Master's Degree** issued by **TECH Technological University** via tracked delivery*.

The certificate issued **by TECH Technological University** will reflect the qualification obtained in the Professional Master's Degree, and meets the requirements commonly demanded by labor exchanges, competitive examinations, and professional career evaluation committees.

Title: **Professional Master's Degree in Rehabilitation and Energy Saving in Buildings**

Modality: **online**

Duration: **12 months**


tech technological university

Awards the following

CERTIFICATE

to

Mr./Ms. _____, with identification number _____.

For having successfully passed and accredited the following program

PROFESSIONAL MASTER'S DEGREE

in

Rehabilitation and Energy Saving in Buildings

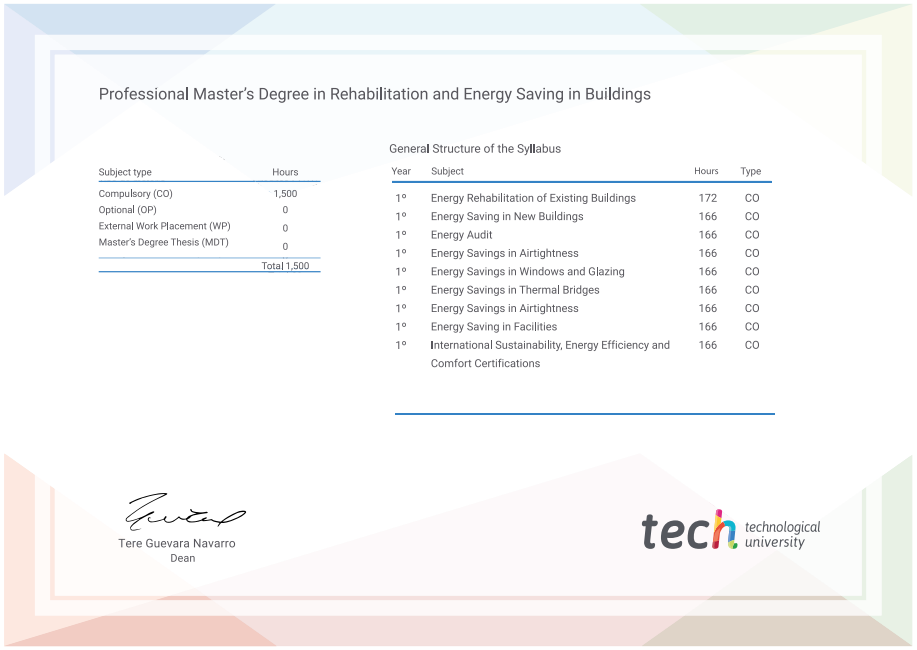
This is a qualification awarded by this University, equivalent to 1,500 hours, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

TECH is a Private Institution of Higher Education recognized by the Ministry of Public Education as of June 28, 2018.

June 17, 2020

Tere Guevara Navarro
Rector

This qualification must always be accompanied by the university degree issued by the competent authority to practice professionally in each country. Unique TECH Code: AFWORD23S techtitute.com/certificates


Professional Master's Degree in Rehabilitation and Energy Saving in Buildings

Subject type	Hours
Compulsory (CO)	1,500
Optional (OP)	0
External Work Placement (WP)	0
Master's Degree Thesis (MDT)	0
	Total 1,500

General Structure of the Syllabus

Year	Subject	Hours	Type
1º	Energy Rehabilitation of Existing Buildings	172	CO
1º	Energy Saving in New Buildings	166	CO
1º	Energy Audit	166	CO
1º	Energy Savings in Airtightness	166	CO
1º	Energy Savings in Windows and Glazing	166	CO
1º	Energy Savings in Thermal Bridges	166	CO
1º	Energy Savings in Airtightness	166	CO
1º	Energy Saving in Facilities	166	CO
1º	International Sustainability, Energy Efficiency and Comfort Certifications	166	CO

Tere Guevara Navarro
Dean

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*Apostille Convention. In the event that the student wishes to have their paper certificate issued with an apostille, TECH EDUCATION will make the necessary arrangements to obtain it, at an additional cost.

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Professional Master's Degree

Rehabilitation and Energy Saving in Buildings

- Modality: **online**
- Duration: **12 months.**
- Certificate: **TECH Global University**
- Schedule: **at your own pace**
- Exams: **online**

Professional Master's Degree

Rehabilitation and Energy Saving in Buildings

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